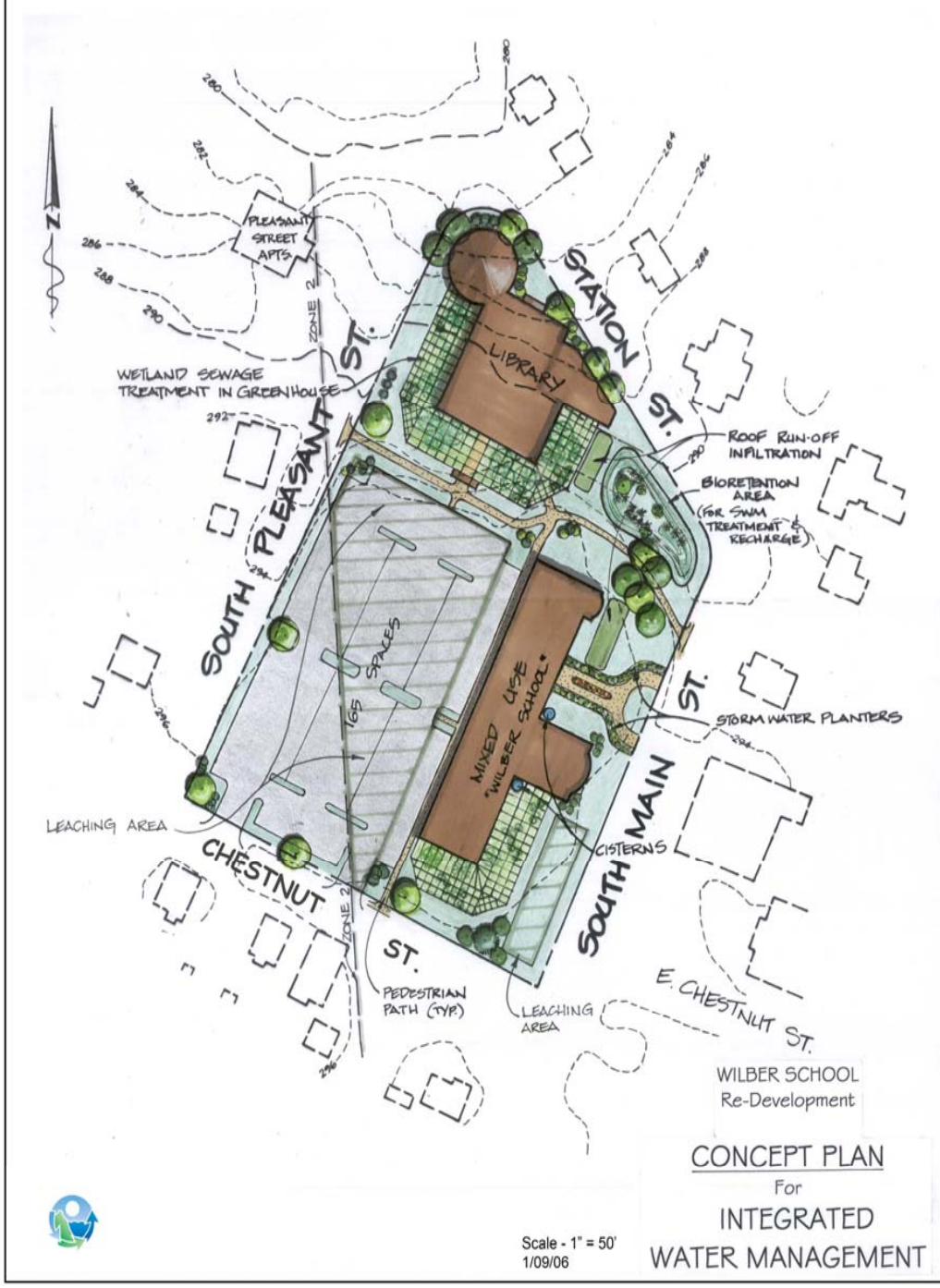
Wilber School Re-development Project: Sharon, MA

Katie Resnick
Scott Horsley
Horsley Witten Group

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LID…..or…..PID?

- Each new development minimized impacts
  = *slow deterioration*
- Each new development caused no new net impacts
  = *no improvement/status quo*
- Each new development produced a positive impact
  = *restoration*


GP Well #4
Beaver Brook
Site

Existing Conditions


N
PLEASANT STREET APTS.
ZONE 2
WETLAND SEWAGE TREATMENT IN GREENHOUSE
LIBRARY
STATION ST.
SOUTH PLEASANT ST.
ROOF RUN-OFF INFILTRATION
BIORETENTION AREA (FOR SWM TREATMENT & RECHARGE)
165 SPACES
MIXED USE "WILBER SCHOOL"
STORM WATER PLANTERS
SOUTH MAIN ST.
LEACHING AREA
CISTERNS
CHESTNUT ST.
ZONE 2
282
284
286
288
290
292
294
296

Goals & Objectives of the Project

- Provide "Smart Growth" Re-development
- Increase recharge/base flow to Beaver Brook
- Reduce nitrogen loading in Zone II Area
- Minimize public supply well water demands

Wastewater Flow Estimation

	Design Flow (GPD)		Actual Flow (GPD)
Library (New construction)	1,501	751	
Retail (1st floor – Wilber School)	700	350	
Office (2nd floor – Wilber School)	1,050	525	
Residential (3rd floor – Wilber School)	2,530		1,265
Subtotal Onsite Flow	**5,781**		**2,891**
Additional Allowable Offsite Flow	4,219	2,100	
Total Onsite and Offsite Flow	**9,981**		**4,991**

Applying Water Savings to Actual Flow

	Water Demand Before Conservation (GPD)	Water Savings	Water Demand After Conservation (GPD)
Library	751	33.3%	500
Retail	350	33.3%	233
Office	525	33.3%	350
Residential	1,265	18.1%	1,036
Onsite Water Demand	**2,891**		**2,120**
Additional Offsite Water Demand	2,100		2,100
Total Water Demand	**4,991**		**4,220**

Total Water Savings = 771 GPD / 15%

Estimating Required and Surplus Roof Runoff

	GPD
Rooftop Runoff Produced Onsite	3,388
Rooftop Runoff Required	
For Toilet Flushing	771
For Irrigation	2,049
Surplus Rooftop Runoff	568

Water Conservation

**Stormwater re-use for toilet flushing and irrigation.*

Conventional water demand:	7,050 GPD
Alternative source (stormwater):	2,820 GPD
Resulting well demand:	**4,220 GPD**

Hydrologic Budget: Existing Conditions

Total Area	3.7 Acres
Impervious Area (Former Wilber School and Parking lot)	1.6 Acres
Pervious Area	2.1 Acres
Recharge Rate (Impervious)	0 in./yr.
Recharge Rate (Pervious)	18 in./yr.
Total Recharge	**2,819 gpd**

Hydrologic Budget: Proposed Project

Net Recharge from Rooftop Runoff (After Reuse)	568 GPD
Parking Lot Runoff (After Bioretention)	768 GPD
Net Recharge of Pervious Areas	2,277 GPD
Onsite Infiltration of Treated Sewage (After wastewater treatment and ET)	3,991 GPD
Subtotal Recharge	7,604 GPD
Water Withdrawals (GP #4)	3,630 GPD
Total Net Recharge	**3,974 GPD**

Net Increase in Groundwater Recharge

- Direct benefit: Increased base flow to Beaver Brook

	Total Recharge
Existing conditions:	2,819 gal./day
Future conditions:	3,974 gal./day

Net Increase = 1,155 gal./day or 41%

Reduction to Nitrogen Load: Wastewater Treatment

Existing Conditions

	Flow (GPD)	Nitrogen Conc. In Wastewater (mg/L)	Nitrogen Load (lbs./yr.)
Wilber School	0	0	0
Apartments/Homes	2,100	35	224
Total	**2,100**		**224**

Reduction to Nitrogen Load: Wastewater Treatment

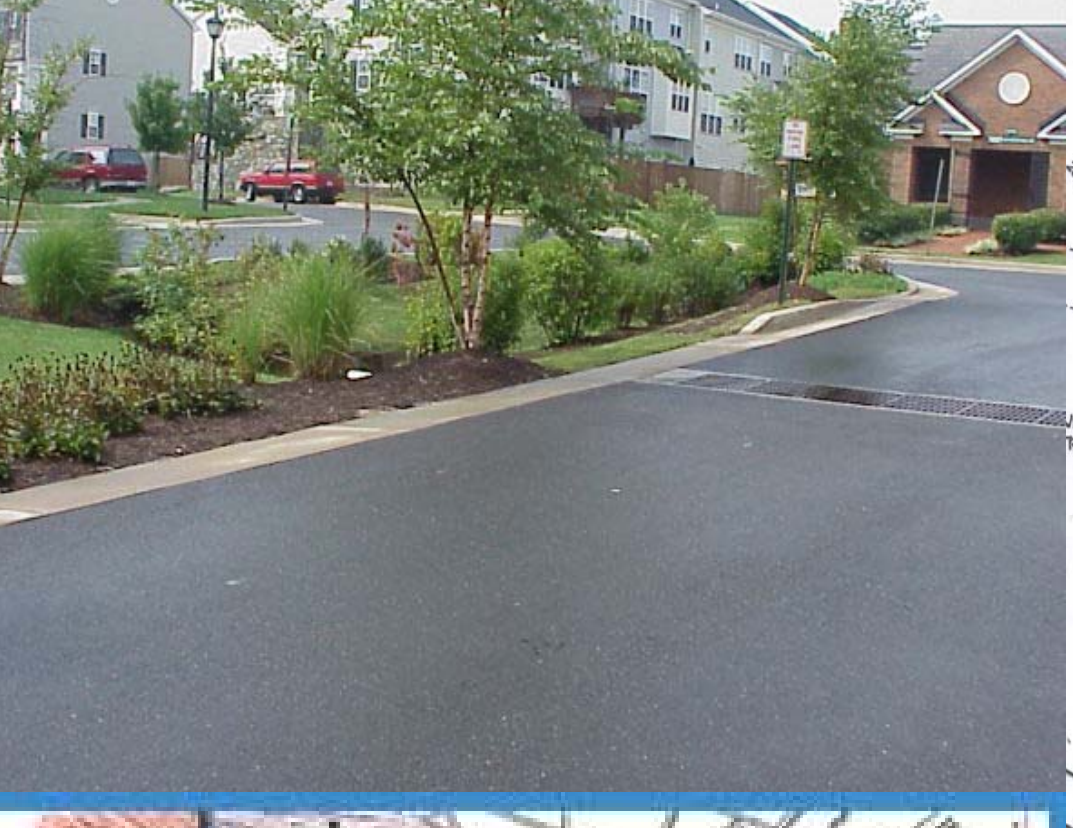
Future Conditions

	Flow (GPD)	Nitrogen Conc. in Wastewater (mg/L)	Nitrogen Load (lbs./yr.)
Wilber School	2,891	10	88
Neighborhood Apts/ Homes	2,100	10	64
Total	**4,991**		**152**

Percent Reduction = 72 lbs./yr. or 32%

Summary of Project

- Mixed use, “Smart Growth” re-development
- Net increase of 1,155 gal./day to Beaver Brook
- Net decrease of 72 lbs./yr. nitrogen load to public water supply well
- Net reduction of 40% in demand on public water supply well
- Public education/demonstration of integrated water management and innovative wastewater design (constructed wetland)

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LEACHING AREA
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